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Before The
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C.

ORIGINAL

In the Matter of)

Creation of a Low Power)
Radio Service)

MM Docket No. 99-25

RM-9208

RM-9242

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AUG 2 1999

**FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY**

To: The Commission

COMMENTS OF THE NEW YORK STATE THRUWAY AUTHORITY

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The New York State Thruway Authority ("NYSTA" or the "Authority") hereby submits its comments in the above captioned proceeding in response to the Commission's *Notice of Proposed Rulemaking* outlining the establishment of a low power FM radio service.¹ As set forth below, NYSTA supports the creation of low power FM service for noncommercial entities, particularly public service entities that are fulfilling critical public safety functions.

INTRODUCTION AND STATEMENT OF INTEREST

NYSTA is a not-for-profit public corporation that operates and maintains the Governor Thomas E. Dewey Thruway (the "Thruway"). The Thruway is a 641-mile superhighway crossing New York State. It is the longest toll superhighway system in the United States. The Thruway

¹ See *In the Matter of Creation of a Low Power Radio Service*, Notice of Proposed Rulemaking (hereinafter "*Low Power Radio NPRM*"), MM Docket No. 99-25, RM-9208, RM-9242 (released February 3, 1999).

stretches from the New York City metro area to Buffalo; a majority of the State's 62 cities (including the nine largest) are located within the Thruway corridor, which contains more than 80 percent of the State's population and registered motor vehicles. About 230 million vehicles travel more than 9 billion miles on the Thruway each year. On average, traffic increases on the Thruway system by 2% to 4% each year.

As part of its operations NYSTA utilizes numerous Traveler's Information Service ("TIS") stations. These TIS stations are low-power AM stations authorized under Part 90 of the Commission's Rules to broadcast public safety and travel advisory information to the motoring public. NYSTA experiences interference throughout its TIS system. During the daytime hours, the interference is particularly strong in the New York City Metro area where atmospheric conditions and received interference from commercial AM radio stations and other TIS facilities significantly reduce, or in some instances eliminate, the operational effectiveness of NYSTA's TIS system. During the nighttime hours, co-channel interference from overpowered AM broadcast stations produce so much interference that at times they knock the Authority's TIS stations off the air; in the Syracuse area the problem is caused by an overpowered Canadian radio station, and in the New York City metro area an overpowered Caribbean station is the source of interference.

NYSTA has implemented various engineering design changes in an effort to minimize interference and increase system capacity on the existing, AM-based TIS service. Ultimately, however, these changes can only moderate, not eliminate, the problem in providing continuous and reliable safety information to highway users. The possibility of migrating to the FM band via a low power FM service such as the one proposed in the NPRM could provide a more permanent solution to the TIS reception problems and greatly facilitate NYSTA's mission of furthering public safety.

As outlined in Exhibit A attached to these Comments, if the Commission adopts rules in

this proceeding that allow operation of low power FM stations, NYSTA would like to construct LP100 stations which would broadcast TIS programming through a highly directionalized signal along the Thruway right-of-way. While directionalizing AM frequencies requires very large, complicated antenna systems occupying large land areas, the same can be accomplished with FM services in a much simpler, more cost-effective manner. The result is that NYSTA could broadcast its public safety and travel advisory messages along the roadway itself, thereby servicing the traveling public, while at the same time diminishing any potential interference low power radio might cause to, as well as receive from, full power co-channel commercial stations.

COMMENTS IN RESPONSE TO ISSUES RAISED IN NPRM

I. The Commission Should Limit Eligibility in Any Low Power FM Service to Non-Commercial Entities.

In the NPRM, the Commission seeks comment on whether it should limit all low power and microradio services to noncommercial operations and whether eligibility should be restricted to noncommercial licensees under the Commission's current rules.² NYSTA strongly believes that the Commission should limit eligibility of this service to noncommercial entities because they provide vital public services not currently performed by commercial licensees. However, in this context "noncommercial" should not be restricted to noncommercial educational organizations as is currently the case. 47 U.S.C. § 397(6). Rather, in the arena of low power FM authorizations, the Commission should define the term "noncommercial entities" as including any "exempt" organization under Section 501 of the Internal Revenue Code,³ as well as any state or local

² NPRM at ¶ 19.

³ 18 U.S.C. § 501(c).

government entity, subdivision, authority, department or corporation. For purposes of any non-government entity, the eligibility should be restricted to nonprofit entities. See 47 U.S.C. § 397(8).⁴

There are many public safety and transportation entities like NYSTA throughout the nation distributing traveler safety information that could benefit from the creation of low power FM services. For numerous transportation entities, broadcast radio is the only way to convey messages on a real time basis. Necessary communications include the announcement of not only unforeseen incidents and accidents, but also planned activities, such as construction schedules, and the suggestion of alternate routes. The role of TIS services in public safety cannot be overstated because not only are they the primary conduit for the transmission of traffic information, but they can also serve as a vital link in the chain of communication systems that will be pressed into service in the event of a local or national emergency. Low power FM could ensure that these critical messages reach motorists as expeditiously as possible, thereby improving safety and efficiency on the nation's roads.

Low power and microradio services could assist local governments in communicating with their citizenry about a host of topics ranging from safety messages to public service announcements to information regarding the delivery of local services. Furthermore, low power and microradio can

⁴ "The term 'nonprofit' (as applied to any foundation, corporation or association) means a foundation, corporation, or association, no part of the net earnings of which inures, or may lawfully inure, to the benefit of any private shareholder or individual."

provide citizens with useful information similar to communities' use of Public, Education and Government ("PEG") cable television channels. However, unlike PEG channels, low power and microradio stations will reach the millions of Americans who do not have access to or cannot afford cable television services, but have radios in their homes.

Low power and microradio would also benefit greatly universities, colleges, and high schools throughout the Nation. Currently, more than 140 colleges and universities operate carrier current, cable or day-time only radio stations, in part because of lack of available FM spectrum and the associated costs of broadcasting a full-power signal under current regulations. Low power FM and microradio will allow educational-based stations to expand their reach to students living off-campus, neighboring families, alumni and other interested neighbors, and will provide students with an opportunity to experience broadcasting to the local community.

II. The Commission Should Reserve a Portion of the Available Low Power and Microradio Licenses for Public Safety Entities or Provide Them with a Preference in Resolving Mutually Exclusive Applications.

As discussed in section I *supra*, there are a variety of noncommercial entities that could benefit from the establishment of low power FM or microradio services. However, public entities performing public safety functions ("public safety entities" or "PSEs") serve a critical role unsurpassed in importance in the nation's communities. For this reason, even if the Commission determines that eligibility for low power authorizations should be limited to noncommercial applicants, NYSTA believes that the Commission should reserve a portion of the low power FM and microradio licenses for PSEs. The need for such a reservation is even greater if the Commission decides not to limit this service to noncommercial entities.

There is ample precedent for the reservation of a part of the broadcast spectrum for designated uses. Just as the Commission has reserved a portion of the FM band from 88.1 MHz to 91.9 MHz exclusively for noncommercial educational use, 47 C.F.R. §§ 73.501, 73.503, the Commission could reserve a portion of the low power band for public safety entities.

The Commission has also reserved spectrum space for police and public safety communications by deleting certain channels from the broadcast spectrum. Congress has specifically directed the reservation of broadcast spectrum for public safety uses. Following Congress' directive in the Balanced Budget Act of 1997,⁵ the Commission reallocated 24 MHz from the UHF band to fixed and mobile use for police and public safety communications. See, Report and Order in ET Docket No. 97-157, FCC 97-421, released January 6, 1998.

Alternatively, the Commission could reserve a number of stations in each media market for PSEs. This proposal would guarantee opportunities to deliver public safety information in all markets in the same manner that the Commission has guaranteed an opportunity to deliver noncommercial educational programming in all markets by reserving at least one TV allocation per market for such noncommercial, educational use. Sixth Report and Order on TV Allocations, 41 FCC 148 (1952).

In the alternative, if the Commission determines that it's not going to reserve a portion of the low power FM and microradio spectrum or licenses for public safety entities, then NYSTA suggests that the Commission grant preferences to PSE applications in the event mutually exclusive applications are filed for the same license. The public interest would not be served by requiring public service entities to compete with commercial interests for spectrum space. By granting the qualified PSE with a demonstrated need for the license a preference, the Commission would

recognize the important role these entities play in enhancing the lives of citizens in communities throughout the nation.

III. The Commission Should Adopt Ownership Rules That Will Enable Public Entities to Obtain the Licenses They Need To Perform Public Safety Functions.

NYSTA strongly urges the Commission not to adopt its proposed rule on local ownership for low power and microradio FM services because such an adoption would effectively limit such licensees to a single station in each market.⁶ When Congress enacted the Telecom Act of 1996, which eliminated numerous broadcast ownership restrictions, Congress articulated its intent that there should no longer be any “one to the market” policies in radio broadcasting.

Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 § 202, 47 C.F.R. § 73.3555 (adopting new ownership rules from Telecom Act). The Commission’s proposed rule in the NPRM is tantamount to a “one to the market” policy for low power and microradio FM services, which Congress has directed be abandoned in the full power service. Further, such a rule would cripple the ability of public service entities like the Thruway Authority to as set string together, forth in Exhibit A, multiple directionalized stations along a geographic corridor to provide necessary safety services to the motoring public. The NYSTA plan requires that the Thruway operate more than one station in individual markets. In the alternative, if the Commission decides to impose some form of one to the market restriction, the Commission should carve out an exception for PSEs providing a public safety function that may require additional licenses.

⁵ Section 3004 of the Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251 ¶3004.

⁶ *Id.*

NYSTA similarly urges the Commission not to adopt its proposed national restriction of five or ten stations for low power FM ownership particularly if, as NYSTA has proposed, the Commission limits the availability of this service to qualified noncommercial entities.⁷ Such a restriction would effectively prohibit NYSTA from using low power FM for its TIS system because NYSTA will need in excess of five or ten stations total in the markets it serves. Further, such a restriction is not consistent with the Telecommunications Act, wherein Congress eliminated national ownership restrictions altogether. *Id.* In a noncommercial context, there are no “antitrust” or market share considerations. Indeed, in a noncommercial context, there would be no economic incentive for a licensee to acquire too many stations because of their inability to be supported through sale of advertising. In the alternative, if the Commission decides to adopt national ownership rules, NYSTA asks that qualified PSEs be exempt from such a rule.

NYSTA submits that the Commission should not employ competitive bidding or auctions if the pool of eligible applicants is restricted to noncommercial entities. The provision of the Communications Act authorizing the use of auctions to select from among competing broadcast applicants specifically excludes noncommercial educational applicants. 47 U.S.C. § 309(j)(1). But the underlying purpose of this exclusion applies to other noncommercial entities as well. By definition, noncommercial applicants will be operating the low power FM stations on a not for profit basis. Unlike commercial operators, noncommercial broadcasters cannot recover the transaction costs of acquiring low power FM licenses through the sale of commercial advertising or for profit operations. Noncommercial licensees do not profit from use of the nation’s airways.

⁷ *Low Power Radio NPRM* at ¶ 60.

Further, the Commission's use of competitive bidding must be consistent with the Commission's obligations in the public interest to continue to use engineering solutions, negotiation, threshold qualifications, service regulations and other means in order to avoid mutual exclusivity in application and licensing proceedings. 47 U.S.C. § 309(j)(6)(E). Low power FM authorizations should be licensed either upon a first-come, first served basis, or on the basis of filing windows of very short duration, with a mandatory period following the cut-off date for applicants to resolve mutual exclusivity by either settlement, frequency coordination or engineering solutions.

NYSTA agrees with the Commission that there should be no local residency requirement. Such a mandate would frustrate the ability of qualified PSEs to provide services. Further, there does not appear to be any demonstrated nexus between local ownership and public service.

NYSTA supports the Commission's proposal to prohibit any entity with an attributable interest in a full power station from having any ownership interest in a low power or microradio station in any market.⁸ Noncommercial entities should have the opportunity to broadcast to citizens without having to compete with well-funded commercial operators.

IV. The Commission Should Adopt Technical Standards That Will Permit Public Entities to Use Low Power and Microradio Services to Fulfill Public Safety Functions.

As set forth in Exhibit A, NYSTA wishes to use the proposed 100-watt secondary service ("LP 100") to provide TIS on the FM band to motorists travelling on the Thruway. The antennas providing TIS would be directionalized to focus their coverage along the Thruway's right-of-way, thereby minimizing the stations' coverage contours and potential for interference. As such, the

⁸ *Low Power Radio NPRM* at ¶ 57.

Thruway Authority's plan for use of LP 100 stations could fulfill the statutory directive in the Communications Act to make the most efficient use of the frequency. 47 U.S.C. § 307(b).

In the NPRM, the Commission seeks input on the appropriate levels of power and antenna height for this service.⁹ The attached Exhibit A outlines how low power FM service would operate as proposed by the Thruway along a section of Interstate 87 between the Spring Valley toll barrier and the Nyack Maintenance facility. In addition, the attached Exhibit A demonstrates how such service as proposed to be operated by NYSTA can comply with the Commission's desire to minimize interference to second and third adjacent channels.

In the model set forth in Exhibit A, which was prepared by NYSTA's technical staff, the basic low power TIS station consists of a low power FM transmitter (5-10 watts output) feeding a moderate gain axial mode helical beam antenna to achieve an effective radiated power (ERP) on the order of 100 watts. The antenna would be mounted at approximately 10 meters HAAT. NYSTA would propose to use monaural broadcast to achieve both better multipath fading and, as sought by the NPRM, impose a tighter emission mask to minimize interference potential on second and third adjacent channels.

It is the intention of NYSTA to operate contiguous groups of stations in simulcast, using a common reference for carrier frequency synchronization and single source program audio origination. Such clusters would be identified with one call sign and would constitute one "station". It is absolutely imperative that the rules for this service permit such operation. Simulcast enables efficient delivery of vital traffic information in a regional corridor without confusing frequency changes, complicated signage, or interference between adjacent segments.

⁹ *Low Power Radio NPRM* at ¶ 30

The attached model demonstrates the following:

1. Although the model is for one module, two antennas, mounted back to back, or offset by an appropriate angle to compensate for road alignment, can cover twice the length of road proposed by a single module.
2. Single models can be "stacked," nose to tail, down the length of a roadway corridor, such as the path of the Thruway in the New York metro area corridor. Transmitter frequency can be locked with parallel delivery of audio as is now used in the AM-band TIS system for a simulcast "ribbon" system.

The flexibility of the design outlined in the attached Exhibit A permits application of low power FM to TIS uses while minimizing interference to co-channel and adjacent channel users and maximize the availability of spectrum to other users.

V. Conclusion

Low power FM service will greatly benefit the public. By restricting the eligibility to noncommercial entities, the Commission can ensure that the service provides needed information to the public without threatening the integrity of the commercial aural broadcast service. Even if the Commission does not decide to limit the service to noncommercial and public service entities, the Commission should consider reserving a portion of the low power FM service to noncommercial, public service entities, for which there is precedent in past Commission policies reserving portions of the broadcast spectrum. Finally, the Commission should not impose undue restrictions that would limit the ability of public service entities to offer the benefits of low power FM service in a larger geographic area than one community.

Respectfully submitted,

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EXHIBIT A

TECHNICAL USE OF LOW POWER FM FOR HIGHWAY ADVISORY RADIO

This is a technical description of an FM HAR system designed to provide real time in route information to drivers on one or more contiguous or separate sections of roadway while minimizing interference potential to others in the service and providing for frequency reuse at minimum obtainable intervals.

Methodology

The basic FM HAR station consists of a low power FM transmitter (5 to 10 watts output) feeding a moderate gain axial mode helical beam antenna to achieve an effective radiated power on the order of 100 watts.

It is intended to use Monaural broadcast for better resistance to multipath fading and to provide for an intent expressed in the NPRM to impose a tighter emission mask on this class of service to minimize interference potential on second and third adjacent channels.

The helical beam antenna design was chosen to provide:

1. Rugged mechanical design
2. Reasonable physical dimensions for moderate gains
3. Broad bandwidth with constant impedance for a single design for the entire band
4. Circular polarization for resistance to fading and multipath for mobile receivers

Gain and transmitter power were sized to provide approximately five miles (8 KM) of linear coverage with an end contour of 0.5 to 1.0 mv/meter, a value which should provide adequate reception quality in current automotive FM receivers, and which is consistent with tight control of the 1mv/m contour adjacent to the highway.

Model Results

The contour plot attached is overlaid on a section of the New York State Thruway (Interstate 87) between the Spring Valley toll barrier just west of 74 degrees 2 minutes, and the Nyack Maintenance facility, just west of Route 303. This section is now covered by simulcast AM HAR stations located at the Spring Valley toll barrier and the Tappan Zee Bridge with a lower power filler station at the Nyack Maintenance shops.

The contours were calculated based on an antenna model concatenated with a propagation model. Transmitter antenna height was set at 10 meters and receiver height estimated at 2 meters (in window or whip type automobile antennas).

An axial mode helical beam model from J.D. Kraus, ANTENNAS -2nd Edition, p.310, Table 7-2, was implemented in Mathsoft's Mathcad 6.0 Professional. Isotropic gain was plotted for a horizontal E-Field and corrected by 2.15 db for reference to a half-wave antenna and by an additional 3 db for half of the available transmitter power contained in the orthogonal E-Field. Since the circularly polarized transmit antenna is coupling to an essentially linearly polarized mobile

antenna, it is not clear whether the Commission considers ERP in this case to be that power radiated in only one of the two orthogonal polarizations.

For a transmitting antenna at 10 meters HAAT the grazing angle for reflections on the path between transmitter and receiver is low and the propagation model given in Terman, ELECTRONIC and RADIO ENGINEERING-4th Edition, p. 811, 22-2 and 22-4, should provide a good approximation. A smooth earth was assumed although additional modeling may be undertaken to include local terrain variation.

The attached figure is the resulting contour plot for a 7 turn helix with a 12 degree pitch, mounted at 10 meters HAAT, at the Spring Valley toll barrier. For this plot, the contour begins 1KM east of the station for better contour line resolution and to avoid the singularity at 0.

- The amplitude of the two side lobes tends to be exaggerated in this model with actual measured pattern results for the helix showing substantially smaller actual lobes.
 - Not shown are two small back lobes, of less than half the amplitude of the indicated side lobes.
1. Note that the worst case adjacent to road contours are at approximately the midpoint of the forward path, but still drop to 1mv/m or less at 3KM from the center line of the path.
 2. A 3db gain improvement, still a very reasonable physical size antenna, can improve the side suppression even further.
 3. Two such antennas, mounted back to back, or offset by an appropriate angle to compensate for road alignment, can cover twice the length of road propose for this single module.
 4. Single modules can be "stacked", nose to tail, down the length of a roadway corridor, such as the path of the New York State Thruway in the NY Division corridor. Transmitter frequency can be locked with parallel delivery of audio as is now used in the AM HAR system for a simulcast "ribbon" system.

The flexibility of the design outlined above permits application of low power FM Highway Advisory Radio that can minimize interference to co and adjacent channel users and maximize the availability of this spectrum to other users.

